



ENVIRONMENTAL MANAGEMENT BRANCH

STUDY GUIDE FOR THE REGISTERED ENVIRONMENTAL HEALTH SPECIALIST EXAMINATION

Introduction

This study guide has been designed to help you prepare for the Registered Environmental Health Specialist written examination prepared by CPS Human Resource Services (CPS), a governmental testing agency. The words *exam* and *examination* are considered the same throughout the guide as are the words *questions* and *items*.

Your formal study, training, and experience in environmental health should have provided you with the knowledge and skills you need to pass the examination. However, we suggest that you also study the information given here about the examination process and content.

In addition to information about the examination process, this guide includes the following:

- Passing Score Information
- General Test Preparation Information and Strategies for Taking Written Examinations
- Examination Content Overview
- Sample Test Questions

If you have any questions regarding your application or this examination, you may contact the Department of Health Services.

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Passing Score Information

Setting the pass point for exams should never be arbitrary. A criterion-referenced approach (e.g., modified Angoff method) is the recommended method for setting the pass point for licensure and certification exams, and the method used to set the pass point for the REHS exams. The modified Angoff method is the most commonly used method and involves setting the pass point on the basis of minimum standards for competent practice (i.e., job requirements) rather than relative candidate performance (e.g., grading on the curve). Subject matter experts in the field are consulted throughout the process to ensure a fair and accurate pass point. Standards are consistently applied to all forms of the exam to ensure a fair pass point for all candidate groups. An advantage of this approach is that the pass point may be lowered for a hard exam and increased for an easy exam.



General Test Preparation Information

Following is information to help you study for the written examination for the State of California Environmental Health Specialist Registration.

- Do some work every day in preparation for the examination. Budget your time; set aside a definite study period for each day. Begin concentrating as soon as you sit down to study.

- Study by yourself and with others to encourage an exchange of ideas. Your study should focus on content areas listed in this study guide. *It is not advisable for candidates to memorize large groups of test questions for the registration test process.* A large computerized item bank has been created to generate different test forms on a regular basis.
- The focus of your study should be on knowledge and skills relevant to a newly registered Environmental Health Specialist.
- Develop your own illustrations and examples to check on your understanding of a topic. Make sure you fully understand the basic terms for each content area. Create your own glossary of terms and look up any new words in a reference book.
- The test will contain items at various levels of cognitive ability. Consequently, it is important to be able to understand, apply, and analyze the material as you would on the job. Although all questions will be in a multiple-choice format, the items will be presented in a number of forms. For example, a written scenario may be followed by a series of three or four questions.
- Some test takers are anxious about taking tests and need to simulate the test taking situation. If this is true for you, you may want to give yourself actual practice in a quiet, distraction-free environment.



General Strategies for Taking Written Tests

The basic format for this test is the multiple-choice format with four distinct choices. Here are some general hints for taking this type of test:

- Most importantly, the test is designed to have *only one answer that is best from among the four choices given*.
- Your attitude about the test process can make a difference. Approach the test confidently. Arrive in plenty of time for the test so you do not feel rushed.
- Be certain that you understand how to correctly use the computer scannable answer sheet. Make sure you are careful to make clean erasures on your answer sheet and to only mark one correct answer per test item.
- Instructions, which will be read to you by a proctor, are very important, so be sure to listen carefully. These may include helpful clues. Ask questions if there is something you do not understand about the

instructions, but be aware that your proctor cannot answer questions about test content issues.

- Read all directions carefully, twice if necessary.
- Your score on this test will be based only on the number of correct choices you make (the number of times you select the best choice from the four given). All test items are equally weighted even though there are different weights for specific program areas. You may guess on questions you are not sure of as you go through the test. Mark them in your booklet for further consideration if you have time after you finish the entire test. Remember, this test does not penalize you for incorrect answers or guessing.
- Read each question carefully, making sure that you understand it before you answer. Reread it if necessary, but do not waste time on questions that seem too unfamiliar or difficult. Interpret words according to their generally accepted meanings. Rephrase or underline key words in difficult questions. No question is intended to be a "trick" or "catch" question.
- Answer the easy questions first; postpone more difficult questions until later, making an initial guess in case you do not have enough time to go back to it. Check your answers if you do have time; however, remember that often your first response is correct.
- Watch your time carefully during the test.
- If you find a question you believe may be incorrect, you can comment on the calculation sheet provided. Include why you believe the question may be incorrect. This must be done during the allotted time for each examination book. Subject matter experts and occupational testing specialists will carefully review all comments. Try to focus on doing well on many items on the test rather than getting bogged down on "making your case" on just one item that counts as one point. CPS uses extensive quality control measures to ensure a flawless test, including panel reviews by qualified subject matter experts in your field, in addition to state-of-the-art computerized scoring and item analysis techniques.





Examination Content Overview

The examination covers a wide range of environmental health topics. Below the environmental health knowledge areas are listed according to their relative emphasis currently applied in California. The next section provides information on the specific knowledge and skills covered by the test. The interrelated nature of the environmental health knowledge and skills means that many questions will relate to more than one topic. The examination contains 260 questions. For administration purposes, the 260 questions are split into two booklets—each comprised of 130 questions.

- ◆ Highest Emphasis on the Exam (*not in any order of importance*):
 - General Math & Science
 - Inspections and Investigation Processes
 - Food and Consumer Protection
 - Drinking Water
- Medium Emphasis on the Exam (*not in any order of importance*):
 - Hazardous Materials and Waste Management
 - Solid Waste and Medical Waste Management
 - Wastewater Management
 - Recreational Waters and Public Pools
 - Disaster Management
 - Pest and Vector Control
- ◆ Lowest Emphasis on the Exam:
 - Air Quality
 - Housing & Institutions
 - Land Use



Detailed Content Categories

A detailed description of each environmental health program area follows. The specific content areas should be interpreted broadly. When examples are provided in the following statements, they are not necessarily inclusive of all things that may be tested. Additionally, each form of the REHS exam samples the knowledge and skills listed below; all of the knowledge and skill statements are not necessarily assessed on a particular exam.

1. GENERAL ENVIRONMENTAL HEALTH

This section is comprised of 55 questions covering (1) general math and science knowledge and skills and (2) knowledge and skills about the inspections and investigation process.

General Math & Science

Knowledge of:

- algebra, geometry, and trigonometry.
- the principles of statistics.
- general biology, including life cycles, behavior, physiology, anatomy, ecology, taxonomy of living organisms, etc.
- microbiology, including general bacteriology, anaerobic and aerobic processes, virus and protozoan pathogens, etc.
- general inorganic chemistry, including nomenclature, properties of atoms, stoichiometry, valance, bonding, oxidation-reduction reactions, molecular structures, etc.
- organic chemistry (e.g., organic structures, bonding, biochemistry).
- the general concepts and principles of epidemiology (e.g., case studies, incidence of disease, causative factors, and modes of transmission).
- methods to control disease and environmental hazards (e.g., refrigeration, disinfection).

Skill to:

- review epidemiological data to determine disease causation and control.
- interpret graphs, charts, and tables (e.g., mean, mode, median, standard deviation).
- interpret technical and scientific data (e.g., attack rate, case distribution).

Inspections and Investigation Processes

Knowledge of:

- laws and regulations related to inspections (e.g., methods of lawful inspections, due process, permits, impound, embargo, seizure, condemnation, and nuisance abatement).
- basic legal terminology (e.g., consent, deposition, subpoena, injunction).
- legal methods used to obtain information for investigations and inspections (e.g., inspection warrant, observation and evidence collection).
- the jurisdiction and structure of environmental health agencies (e.g., federal, state, regional, and local).
- general environmental sampling and testing concepts (e.g., chain of custody, sample integrity, representative sampling).
- personal protection equipment and procedures (e.g., hard hats, ear plugs, air purifying respirators).
- cultural practices and norms.
- conflict resolution techniques (e.g., de-escalation).
- basic interviewing techniques and principles.
- ethical practices (e.g., conflict of interest, not accepting gratuities/gifts).

Skill to:

- read and comprehend complex written material.

- interpret data quality, including analysis methods, detection limits, sampling methods, and quality control.
- gather data/information (e.g., photographs, samples, test results, statements) according to protocols.
- calibrate, use, maintain, and read the results of field inspection equipment (e.g., pool test kits, gas meters, fat analyzers, thermometers).
- make initial communication and observations for an inspection or investigation.
- identify of applicable environmental health laws during an inspection or investigation.
- draw conclusions and summarize findings of an inspection or investigation.
- prioritize tasks.

2. FOOD AND CONSUMER PROTECTION

Knowledge of:

- federal and state laws regulating food facilities (e.g., California Uniform Retail Food Facilities Law; Sherman Food, Drug, and Cosmetics Law).
- Hazard Analysis Critical Control Point (HACCP) principles, including control and disease prevention methods.
- acute food-borne illness causation (e.g., time/temperature, improper cooking/cooling, cross contamination, and personal hygiene).
- bacteria, viruses, fungi, and parasites as related to food-borne illness.
- chemical contaminants related to food-borne illness and/or food adulteration, such as cleaning supplies, copper, lead, galvanized metal, pesticides, additives (e.g., MSG), and sulfites.
- physical contaminants (e.g., glass, Band-aids, jewelry, insects, machine parts) related to food adulteration.
- food and beverage sampling and testing methods.
- modes of food-borne illness transmission (e.g., fecal/oral, toxins, infected wounds).
- etiological agents (e.g., salmonella, shigella, campylobacter, hepatitis A and E, E. coli, botulinum, Norovirus, listeria monocytogenes, trichinella spiralis) and resultant diseases.
- food-borne illness symptoms of infections, intoxications, and toxin-mediated infections (e.g., cramping, diarrhea, nausea, fever, headaches).
- potential effects of multiple environmental factors in disease causation (e.g., immune system, nutrition, health, age).
- food product labeling requirements (e.g., Sherman Food, Drug, and Cosmetics Law).
- disease attack rates and laboratory results related to food-borne illness investigations.

- incubation periods for etiological agents to assist in agent identification.
- applicable codes for evaluating food facility construction plans (e.g., Uniform Building Code, Uniform Plumbing Code, Uniform Mechanical Code).
- mechanical engineering principles relevant to reviewing construction plans (e.g., exhaust hood ventilation).
- architectural, mechanical, and construction material terminology relevant to plan review (e.g., fiberglass reinforced plastics (FRP), cubic feet per minute (CFM), feet per minute (FPM)).
- equipment standards, certifying or testing agencies, and associated specifications relevant to food facilities.

Skill to:

- integrate food histories, incubation period, and symptoms to assist in etiological agent identification and mode of transmission.
- calculate attack rates/morbidity rates related to food-borne illnesses.
- read construction plans for various food facilities and perform relevant calculations.

3. DRINKING WATER

Knowledge of:

- state laws regulating water wells, water systems, and water resources, including the California Safe Drinking Water Act.
- epidemiology related to water-borne diseases.
- source water sampling instruments and methods (e.g., Kemmerer bottles, polyethylene sample bottles).
- California primary drinking water quality standards (e.g., radioactivity, organic, inorganic).
- California secondary drinking water quality standards (e.g., turbidity, color, Ph, alkalinity).
- plumbing and hydraulics relevant to drinking water systems (e.g., cross connections).
- water supply sources (e.g., ground water, surface water, springs).
- potential sources of ground and surface water contamination (e.g., underground storage tanks, agricultural activities, sewage disposal systems).
- state well construction standards (e.g., Bulletin 74 and its amendments), such as annular seals, casing, packing, construction type, and geological formation.
- chemical contaminants (e.g., nitrate, arsenic, lead, selenium, copper, mercury) as related to water-borne illnesses.
- how to develop a water sampling plan (e.g., location, what to sample).

- modes of water-borne illness transmission (e.g., cross-connections, pollution, treatment system failure).
- etiological agents (e.g., salmonella, shigella, campylobacter, hepatitis A and E, E. coli, giardia, cryptosporidium, pseudomonas) and resultant diseases.
- water-borne illness symptoms of infections, intoxications, and toxin-mediated infections (e.g., dermatitis, gastroenteritis).
- potential effects of multiple environmental factors in disease causation (e.g., poor immune system, nutrition, health, age).
- disease attack rates and laboratory results related to water-borne illness investigations.
- incubation periods for etiological agents to assist in agent identification.
- surface water treatment processes (e.g., slow sand filtration, media filtration).
- types of disinfectants (e.g., chlorine, ozone, ultraviolet light).
- minimum water quantity requirements to meet use demands, including source, storage, and distribution.
- public water system categories (e.g., community, nontransient-noncommunity, transient-noncommunity).
- mechanical engineering principles and calculations relevant to reviewing construction/site plans.

Skill to:

- integrate case histories, incubation period, and symptoms to assist in the identification of the etiological agent and mode of transmission.
- interpret laboratory data (e.g., results and detection limits) related to water quality.
- convert measurement units (e.g., milligrams per liter to ppm).
- apply laboratory data and results in water-borne illness investigations.
- read construction/site plans for various structures or systems (e.g., distribution layout, drinking water wells, water storage tank).

4. HAZARDOUS MATERIALS AND WASTE MANAGEMENT

Knowledge of:

- federal and state laws regulating hazardous material/waste handling (e.g., Title 22, Title 23, Title 27, Health and Safety Code, Resource Conservation and Recovery Act, Code of Federal Regulations Title 40).
- environmental sampling protocols (e.g., appropriate sample sizes, methods, and containers).
- environmental testing equipment (e.g., combustible gas meters, coliwasa tubes,

Dräger tubes, photo ionization detectors, hazcat testing) related to hazardous material and hazardous waste management and emergency response.

- emergency response procedures relative to hazardous materials and hazardous waste incidents (e.g., incident command system).
- fire hazard issues (e.g., Article 80, compatibility, chemical inventory reporting) related to hazardous material storage.
- permit requirements related to hazardous materials and hazardous waste management (e.g., hazardous waste treatment, underground storage tanks, above ground storage, hazardous material storage).
- remediation principles and site cleanup methods (e.g., plume models, hydrogeologic principles, chemical transport, vadose zone monitoring, on-site treatment of materials, risk assessment, risk management).
- hazardous materials storage principles (e.g., compatibility, secondary containment, seismic, security, labeling).
- underground storage tank regulations (e.g., Title 23).
- the principles of hazardous waste minimization (e.g., product substitution, recycle, reuse, treatment on-site).
- chemistry (e.g., volatile organics, heavy metals, oxidizers, reducers, corrosivity, ignitability, toxicity, reactivity, vapor pressure, specific gravity, boiling point, flash point, vapor density) relative to hazardous materials and hazardous waste.
- modes of chemical exposure (e.g., dermal, inhalation, ingestion, injection).
- household hazardous materials and management and control measures.
- hazardous waste inspection requirements (e.g., accumulation storage periods, waste storage practices, on-site treatment and disposal, disposal record review, employee training record review).
- personal protective equipment for use with hazardous materials (e.g., respirator cartridges, SCBA, chemical resistant suits).
- hazardous waste characteristics (e.g., corrosive, ignitable, toxic, reactive).

Skill to:

- interpret laboratory data (e.g., results, detection limits, test methods) and site reports related to contaminated site remediation and/or hazardous waste identification.
- read construction/site plans for hazardous materials storage and underground storage tanks and perform relevant calculations.

5. SOLID WASTE AND MEDICAL WASTE MANAGEMENT

Knowledge of:

- federal and state laws regulating solid waste handling, disposal, and recycling (e.g., Titles 27 and 14, Public Resource Code).
- federal and state laws regulating medical waste handling, treatment, and disposal (e.g., California Health and Safety Code).
- acute diseases pertaining to medical waste exposures (e.g., hepatitis, HIV).
- blood-borne pathogens (e.g., hepatitis, HIV).
- universal precautions (e.g., personal protective practices, use of proper equipment and containers) for medical waste exposure.
- hazardous waste at a solid waste facility (e.g., load checking programs, universal waste, electronic waste) in order to comply with permit requirements.
- landfill operations (e.g., load check procedures, daily cover, vector control, staff training plans, litter control, leachate control methods, landfill gas monitoring and control).
- medical waste issues (e.g., medical waste plan, time tracking of removal, waste storage, on-site treatment, and disposal tracking documents).
- transfer station operations (e.g., load check procedures, vector control, staff training plans, litter control, odor control, recycling).
- composting operations (e.g., load check procedures, vector control, staff training plans, litter control, temperature logs, odor management implementation plan).

6. WASTEWATER MANAGEMENT

Knowledge of:

- state laws related to liquid waste treatment and disposal (e.g., Regional Water Quality Control Board Basin Plans, Porter-Cologne Water Quality Act, construction guidelines, Uniform Plumbing Code).
- the general impacts of storm water pollution and prevention methods (e.g., control discharges to storm drains).
- general practices used in municipal wastewater treatment plants (e.g., screening, sedimentation, digestion, filtration, aeration).
- general practices used in on-site sewage disposal systems (e.g., siting, protection of ground and surface water, sedimentation tanks, anaerobic digestion).
- potential uses for reclaimed water (e.g., irrigation, gray water) and control measures to prevent cross-connections (e.g., color-coded pipes).

- disease control and prevention measures related to liquid waste management and pollution prevention.
- pathogens found in raw sewage (e.g., vibrio, hepatitis, shigella, giardia).
- on-site sewage disposal system design practices (e.g., mounds systems, pressure dosing systems, conventional leach fields, sand filter systems).
- soil percolation test procedures and their applicability to on-site systems.
- soil science (e.g., soil types, soil texture, seasonally saturated soil, depth to ground water, percolation rates) relative to on-site sewage disposal system design.
- the constituents of wastewater (e.g., nitrates, coliform bacteria, fecal coliform bacteria, total dissolved solids, foaming agents, biological oxygen demand, dissolved oxygen) and their significance.
- plumbing and hydraulics relevant to sewage drainage systems.

Skill to:

- identify soil types and characteristics (e.g., sand, silt, clay, mottling) relative to on-site sewage disposal system designs.
- identify failing and near failing on-site sewage disposal systems (e.g., surfacing effluent, fluorescein dye test).
- read construction/site plans for on-site sewage disposal systems and perform relevant calculations.

7. RECREATIONAL WATERS AND PUBLIC POOLS

Knowledge of:

- state laws regulating public swimming pools and recreational waters (e.g., California Health & Safety Code and California Code of Regulations Title 22 and 24).
- water quality standards and guidelines relative to natural bathing places (e.g., coliform/fecal coliform/enterococcus sampling criteria and limits).
- water sampling criteria at public beaches (e.g., depth of sample, impact of storm drain discharge).
- circumstances that require pool or beach closure.
- pool and spa construction criteria (e.g., slope, steps, filtration, chlorination, turnover rate, safety signage, safety features, fencing, flow rate, drain cover, light GFCI).
- control and disease prevention measures (e.g., pH, chlorination, filtration).
- sanitation and safety issues for public pools and spas (e.g., debris in pool, shower facilities, toilet

facilities, drinking fountain, pool water clarity, safety equipment, signage).

- epidemiology as related to public pools and recreational waters (e.g., Norovirus, shigella, E. coli, giardia, cryptosporidium, legionella, pseudomonas).
- acute diseases related to contact with recreational water, such as skin or ear/nose/throat diseases (e.g., dermatitis, enterohemorrhagic colitis, gastroenteritis, and giardiasis).
- plumbing and hydraulics relevant to pools and spas.
- mechanical engineering principles relevant to reviewing construction/site plans (e.g., pool hydraulics, flow rates).
- equipment standards, certifying or testing agencies, and associated specifications relevant to pools and spas.

Skill to:

- collect a water sample from a pool or spa.
- collect water samples at public beaches.
- read construction/site plans for pools and spas and perform relevant calculations.

8. DISASTER MANAGEMENT (includes RADIATION PROTECTION)

Knowledge of:

- control and disease prevention measures during natural and man-made disasters such as earthquakes, floods, fires, and bioterrorism events (e.g., anthrax threats).
- disaster response protocols, communications, and coordination procedures (e.g., incident command system, coordination of staff/resources, assignment of tasks).
- emergency/disaster sanitation issues (e.g., drinking water supply, food, shelter, waste disposal, portable toilets, vector control, removal of dead bodies/animals).
- ionizing radiation (e.g., gamma) and its effects on human beings (e.g., Roentgen equivalent man [rem], somatic effects, genetic effects, teratogenic effects).
- radiation protection principles (e.g., protective equipment, shielding, distance, sources).
- radiation sampling and monitoring equipment (e.g., dosimeter, Geiger counters, volume air samplers).

9. PESTS AND VECTORS

Knowledge of:

- federal and state laws regulating the control of animal vectors that transmit and/or maintain a

reservoir of disease agents (e.g., reporting requirements involving animal bites).

- field sampling procedures for the detection and monitoring of vector-borne diseases (e.g., trapping methods, flea combing techniques, blood specimen collection, live flea and tick collection).
- the maintenance and transmission cycles of the etiological agents (e.g., hantavirus, West Nile virus) responsible for vector-borne diseases (e.g., rabies, plague, Lyme disease, malaria, encephalitis, tularemia).
- the incubation period, initial signs, and common symptoms related to various vector-borne diseases (e.g., the manifestation in 2-6 days of fever, chills, muscle aches, weakness, and swollen/tender lymph nodes following exposure to the plague bacillus).
- the biology, behavior, and habitats of the vertebrates and invertebrates that contribute to vector-borne diseases (e.g., ticks, mosquitoes, rodents, fleas).
- disease prevention measures through effective vector control (e.g., proper pesticide application, integrated pest management).
- lawful pesticide use related to the control of vectors with public health significance (e.g., labeling, warning properties, application rate) and the certification required to perform those activities (e.g., Certified Pest Control Operator).

Skill in:

- field identification of vertebrates and invertebrates of public health significance (e.g., roof rats, Norway rats, mosquitoes, bed bugs, ticks).
- properly handling and transporting samples (e.g., vertebrates, invertebrates, blood), including personal protection and ensuring the integrity of the sample.

10. AIR QUALITY

Knowledge of:

- federal and state air quality laws and regulations (e.g., Federal Clean Air Act, California Clean Air Act).
- air contaminants (e.g., carbon monoxide, sulfur dioxide, nitrogen oxide, ozone, particulate matters in air [smoke, dust, pollen]).
- indoor/outdoor air sampling and testing methods (e.g., particulate samples, gas analysis) and potential outcomes.
- etiological agents, infectious agents, and resultant diseases (e.g., tuberculosis, legionellosis, psittacosis) relative to air-borne exposures.
- indoor air pollutants (e.g., radon, molds, asbestos, formaldehyde, carbon monoxide).

- outdoor air quality pollution standards (e.g., PM 10, PM 2.5, ozone, nitrogen oxide, sulfur dioxide, hydrocarbons).



Sample Questions

GENERAL MATH & SCIENCE KNOWLEDGE

1. The Inverse Square Law is commonly used in which environmental health program areas to calculate the intensity or strength of a substance at a specified distance from the point source?
 - a. radiation, lighting, and noise
 - b. noise, air emissions, and radiation
 - c. radiation, fluoridation in water, lighting, and noise
 - d. lighting, sewage contamination in stream, and air emissions
2. If $15x + 3 = 7x - 13$, then x equals
 - a. - 2.0
 - b. +2.0
 - c. +2.5
 - d. +4.0

INVESTIGATIONS & INSPECTIONS PROCESS

3. What is the legal term which describes the failure to perform an official duty as an Environmental Health Specialist without sufficient excuse?
 - a. malfeasance
 - b. misfeasance
 - c. nonfeasance
 - d. criminal responsibility
4. In the field of public health law, state government's police power is an attribute of a sovereign government; whereas, the federal government is a government of
 - a. absolute police power.
 - b. delegated police power.
 - c. limited delegated powers.
 - d. constitutional police power.
5. An epidemiological study which follows a group of people over time is a _____ study.
 - a. regressive
 - b. prospective
 - c. progressive
 - d. retrospective

11. HOUSING & INSTITUTIONS

Knowledge of:

- applicable state housing codes (e.g., Title 17, Title 15, Title 25, State Housing Law, Uniform Housing Code).
- acute and chronic disease causation (e.g., tuberculosis, dermatitis, pulmonary obstructive disorders, asthma) related to housing.
- housing safety issues (e.g., basic electrical, basic structural, mold, asbestos, carbon monoxide, radon, sanitation).
- sources of lead poisoning exposure (e.g., paint chips, dust, soil, lead pipes/solder, home remedies, bean pots, imported foods).
- residential maintenance, occupancy, and structural standards for motels, hotels, apartments, single family dwellings, etc.
- how to acquire information on institutional maintenance, occupancy, and structural standards for jails, detention facilities, farm worker housing, hospitals, shelters, schools, dorms, organized camps, etc.
- housing issues related to vectors (e.g., cockroaches, rodents, bed bugs, spiders, lice, mites).

12. LAND USE (includes NOISE CONTROL)

Knowledge of:

- state laws regulating land use (e.g., California Subdivision Map Act, California Environmental Quality Act, Zoning Ordinances, Conditional Use Permits).
- drinking water quality (e.g., bacteriological, chemical) and water quantity (e.g., flow rate) standards.
- geology, hydrology, watershed management, and soil science (e.g., wetlands, topography, soil morphology, flood zones) related to sewage disposal for property development.
- the principles of toxicology, toxic chemicals (e.g., lead, arsenic, asbestos), and types of previous land uses (e.g. mining activities, military bases, drug labs, and cemeteries) and their impact on land use decisions.
- general noise principles (e.g., decibel, logarithmic progression, human health effects, source control).

6. A sample collected over a short time period where the atmospheric concentration is assumed to be consistent throughout the sample period is called a(an) _____ sample.
- grab
 - small
 - partial
 - integrated

FOOD AND CONSUMER PROTECTION

7. Adequate cooking will not always prevent *Clostridium perfringens* food poisoning because
- the enterotoxin is heat stable.
 - the spores are heat-resistant and may survive.
 - it is a rapidly growing pyrophilic organism.
 - incomplete heat distribution results in new bacterial colony formation.

DRINKING WATER

8. The level that a vacuum breaker must be installed above the flood rim of the fixture or receptacle it is serving is called the _____ level.
- installation
 - anti-siphoned
 - critical
 - backflow

HAZARDOUS MATERIALS AND WASTE MANAGEMENT

9. Pursuant to the California Right to Know Law, facilities that handle hazardous materials are primarily required to submit
- Material Safety Data Sheets.
 - a business plan.
 - a list of all hazardous materials.
 - a list of all acutely hazardous materials.

SOLID WASTE AND MEDICAL WASTE MANAGEMENT

10. The Paint Filter Liquid Test is used at landfills to determine
- the soil permeability of cover material.
 - the sludge content of incoming waste.
 - if leachates have been formed.
 - if wastes may be landfilled.

WASTEWATER MANAGEMENT

11. Which statement about hydraulic conductivity in soils is true?
- Hydraulic conductivity increases for all soils as they dry.
 - Soils with small, discontinuous water-filled pores have high hydraulic conductivity.
 - Unsaturated soils with large air-filled pores have a high hydraulic conductivity.
 - As soils dry, the hydraulic conductivity of clay soils can become greater than that of sandy soils.

RECREATIONAL WATERS AND PUBLIC POOLS

12. Assuming a high-rate sand filter is operated at 15 gallons per minute per square foot, the minimum size filter needed for a 36,000-gallon swimming pool operating with a six hour turnover rate is _____ square feet.
- 6.67
 - 12.72
 - 23.33
 - 40.01

DISASTER MANAGEMENT

13. In the event of a natural disaster, the safest source of drinking water would be from a(an)
- toilet tank.
 - open cistern.
 - water heater.
 - swimming pool.
14. Radon does not have the characteristic of
- being known to cause cancer.
 - having a long half-life.
 - having the ability to enter homes through a water well.
 - occurring naturally in the soil.

PEST AND VECTOR CONTROL

15. The causative agent of Weil's Disease resulting from direct or indirect contact with the infected urine of rodents and certain other animals is _____ spp.
- Yersinia*
 - Leptospira*
 - Rickettsia*
 - Wuchereria*

AIR QUALITY

16. Inhalation of asbestos fibers may cause asbestosis,
- a. cancer, and mesothelioma.
 - b. eye irritation, and skin rash.
 - c. coughing, and pulmonary edema.
 - d. lymphothelioma, and sensitization.
17. The problems associated with pneumoconiosis are not heavily influenced by the
- a. rate of pressure rise.
 - b. size of dust particles.
 - c. length of particle exposure.
 - d. concentration of airborne dusts.

HOUSING & INSTITUTIONS

18. The determination of overcrowding in residential units is based on the number of persons per
- a. bedroom.
 - b. net square feet of habitable room.
 - c. gross square feet of residential unit.
 - d. cubic feet of airspace in dwelling unit.

LAND USE

19. Which situation best describes an incompatible land-use?
- a. One property is adversely impacted by the environmental pollutants generated on an adjacent parcel.
 - b. The value of one property is greatly increased because of the presence of a more valuable land-use for nearby property or properties.
 - c. The land-use allowed on one property adversely affects the health of the residents on an adjacent property.
 - d. The land-use allowed on one parcel or property adversely impacts or restricts the use of an adjacent or nearby property or properties.
20. Two identical pumps located side-by-side produce a sound level of 80 dBA at a distance of 10 feet. If one of the pumps is turned off, the sound level at 10 feet is _____ dBA.
- a. 40
 - b. 70
 - c. 77
 - d. 80

ANSWER KEY

- | | |
|----|---|
| 1 | A |
| 2 | A |
| 3 | C |
| 4 | C |
| 5 | B |
| 6 | A |
| 7 | B |
| 8 | C |
| 9 | B |
| 10 | D |
| 11 | D |
| 12 | A |
| 13 | C |
| 14 | B |
| 15 | B |
| 16 | A |
| 17 | A |
| 18 | B |
| 19 | D |
| 20 | C |